

REMARKS

The Examiner's Action dated May 14, 2003, has been received and its contents carefully noted.

The Specification has been amended to identify the terms referred to in Sections 3 and 4 of the Action as registered trademarks and to identify them generically. Accordingly, it is requested that the objection to the specification be withdrawn.

In response to the claim rejections under 35 U.S.C. 112, second paragraph, claim 1 has been amended to recite "a conversion device" and claim 10 has been amended to depend from claim 9.

Claims 1-14 are pending.

The indication of allowability of claims 9 and 13 is noted with appreciation. However, it is believed that the applicant is entitled to broader protection for their invention. Accordingly, claims 9 and 13 have been retained in dependant form.

The rejection presented in Section 9 of the Action is traversed on the grounds that the claimed subject matter, and particularly the device defined in parent claim 1, is not disclosed in or suggested by any reasonable combination of the teachings of the applied references.

The present invention is directed to a high spatial resolution scintigraphic device having a collimator and a scintillation crystal structure. According to the invention, and as defined in claim 1, the scintillation crystal structure is constituted by a multiplicity of individual crystals with polygonal section and the collimator has a multiplicity of equal conduits, each conduit having a polygonal section corresponding to the polygonal section of each individual crystal. This arrangement, which provides a one to one correspondence between collimator conduits and individual crystals, assures that photons in each conduit will reach a specific, corresponding crystal, making possible a higher image resolution. Such an arrangement employing individual crystals is not suggested by any combination of the teachings of applied references.

The primary reference, Majewski, discloses a gamma camera employing a crystal scintillator that contains a YAP crystal array. The crystal array is arranged in a square shaped matrix placed in front of a collimator. The reference provides no details regarding the structure of the collimator or its individual conduits. However, it is clear from the patent drawings that no attempt was made to establish any particular correspondence, either in shape or size, between the crystals and the collimator conduits.

Gamma cameras that were known at the time of filing of the reference patent application contained conduits, or channels, of hexagonal cross-section. Thus, as of the filing date of the Majewski patent, those skilled in the art would have been aware that the collimator would have channels with a cross-section distinctly different from the square shape of the elements of the crystal matrix disclosed in that reference. Given this fact, and the information provided by the drawings of the reference, one skilled in the art would have no motivation, based on the teachings of that reference, to provide a device in which the collimator conduits and the individual crystals have corresponding cross-sections.

It is further submitted that one skilled in the art would have no reason to modify the arrangement disclosed by Majewski on the basis of the teachings of the secondary reference, Cusano. This reference discloses a gamma camera scintillator that used powders of a type commonly known as phosphors, which have a limited scintillating characteristic. According to the disclosure of this secondary reference, these powders are partially filled into the collimator channels and mixed with a binding material. This mixture is then solidified by heat treatment inside the collimator channels (page 3, lines 14-25). A light reflective material is then formed by vapor deposition of silver on the surfaces of the

solidified powder mixtures that are oriented toward the photon source. Applicants assert that the invention disclosed in the secondary reference has no practical value because the scintillating characteristics of the phosphors disclosed are quite inferior to the previously known single plain crystals.

It would not be obvious to modify the device of the primary reference in accordance with the teachings of the secondary reference because, firstly, the phosphors employed in the secondary reference do not provide a practically useful gamma camera and because the formation of scintillating elements *in situ* from a powder is fundamentally different from the provision of single crystals.

Furthermore, the construction of a device according to the present invention requires that each solid scintillating crystal be individually manufactured and specifically shaped to conform to the shape of the corresponding collimator conduits and neither reference provides a suggestion for producing crystals in this manner.

Furthermore, the modification relied upon to support the rejection would be contrary to the teachings of the primary reference, which clearly considers that there need be no correspondence in shape between the collimator conduits and the scintillator crystals.

Thus, claim 1 clearly distinguishes patentably over any reasonable combination of the teachings of the applied references by its recitations of a multiplicity of individual crystals having polygonal shapes and of the provision of collimator conduits having cross-sections corresponding to those of the crystals.

It is noted that the invention disclosed in the Majewski patent is based in part on articles published by the present inventors and others in 1994 and 1995. Copies of these articles, which are cited in the Majewski patent, are enclosed for the Examiner's consideration.

With regard to the rejection of claim 2 and claims dependant therefrom, it is noted that claim 2 specifies that each individual crystal has a layer of an optically reflecting and diffusing material on its base face, which is oriented toward the source of photons, and in the interspace between the lateral surfaces of the crystal and the adjacent septa. This is not disclosed in the applied references. On the contrary, Cusano only discloses providing a reflective coating after solidification of the powder mixture, which coating will be only on the base face of each solidified body.

Claims 3 and 4 are directed to the embodiments shown in figures 5A and 5B and define structural features that are not disclosed by Cusano. Claim 3 specifies that each of the

crystals has a crystal end portion projecting beyond the common end plain of the collimator and claim 4 specifies that the base faces of the crystals that are oriented toward the photomultiplier are totally internal to the conduits. Cusano, of course, only discloses forming the crystals so that their corresponding faces will be flush with the end of the collimator.

Claim 5 further distinguishes over the prior art by its recitation that the compartments between the base faces of each crystal, the adjacent surfaces of the septa of the conduits, and the common end plain of the collimator present an optical guide material. Although it is true that Majewski teaches the use of optical guide 24, this reference does not teach the concept of dividing the optical guide material into separate parts, one for each compartment.

Claim 8 further distinguishes over the applied references by its recitation that the crystals in the corresponding conduits of the collimator have corresponding square cross-sections. Although Majewski discloses such a cross-section for the crystals, that reference provides no disclosure regarding the cross-section of the collimator conduits and, as already noted above, the conventional practice in the art as of the filing date of the Majewski patent was to give the collimator conduits a hexagonal cross-

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section. Cusano does not provide any details regarding the cross-sections of his collimator conduits, or, it follows, of his scintillator bodies.

All of the other claims should be considered allowable, at least in view of their dependency from claim 1.

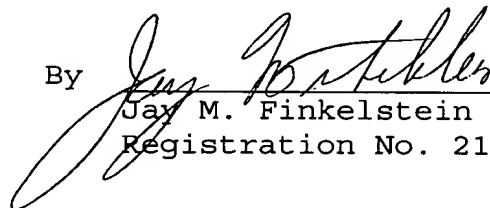
Accordingly, it is requested that the rejections presented in the action be reconsidered and withdrawn, that all of the pending claims be allowed, and that the application be found in allowable condition.

If the above amendment should not now place the application in condition for allowance, the Examiner is invited to call undersigned counsel to resolve any remaining issues.

Respectfully submitted,

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